

### REMARKS

A Final Office Action mailed March 22, 2004 has been received and carefully reviewed. Claims 1-14 and 39 (formerly numbered 15) are pending in the application. Claims 1-14 and 39 are rejected.

Applicant appreciates Examiner's indication of allowability of claim 2 at paragraph five on page three of the Office Action.

In paragraph four on page two of the Office Action, claims 1, 3-14, and 39 were rejected under § 103(a) over JP 10-256621, hereinafter the Takuji reference, in view of Journal of Applied Physics article "Oxygen as a surfactant in the Growth of Giant Magnetoresistive Spin Valves" to Engelhoff et al.

Applicant respectfully traverses the § 103(a) rejection. Applicant respectfully asserts that the requirements are not present and a *prima facie* rejection fails under 35 U.S.C. § 103(a) because the Office Action fails to cite a reference or references that teach, disclose or suggest all the claim limitations of Applicant's application.

Applicant's invention requires "forming at least one copper layer in a NiMn top spin valve; oxidizing the at least one copper layer in the NiMn top spin valve; and depositing remaining layers of the NiMn top spin valve head."

The Takuji reference, on the other hand, teaches a new construction of a spin-valve type having a magnetic field inversion layer of a low coercive force by using a base layer composed by laminating a Zr layer and a Cu layer in this order. The Takuji teaching, however, does not teach, disclose or suggest "oxidizing the at least one copper layer in a NiMn top spin valve" from the instant application.

The Egelhoff article suggests using oxygen as a surfactant in the growth of giant magnetoresistance spin valves. Egelhoff suggests that oxygen may be used to suppress defects and to create a surface which scatters electrons more specularly. More specifically, Egelhoff suggests that layers for a spin valve be formed in an oxygen environment to suppress intermixing of, for example, Co and Cu layers. Egelhoff also states that using a layer of oxygen as a surfactant on Cu layers provides an increase in GMR wherein, as a surfactant, the oxygen acts as a coating without being incorporated

into the Cu layer. However, forming layers of a spin valve in an oxygen environment and forming a layer of oxygen over a Cu layer is not the same as "oxidizing the at least one copper layer in the NiMn top spin valve." Further, Egelhoff teaches that using materials other than Co yields less desirable results.

Because Egelhoff emphasizes the advantage of using pure Co in fabricating spin valves and teaches away from using substitution materials because "the GMR is always much smaller," and Takuji does not mention pure Co as a material to be used in spin valves, motivation to combine Takuji with Egelhoff is missing. Accordingly, "[i]t is improper to combine references where the references teach away from their combination." *See* M.P.E.P. § 2145.

Additionally, because Takuji focuses on using Zr and Cu as a base layer to fabricate spin valves having high MR change rates and uniaxial anisotropic magnetic fields, and because Egelhoff does not mention combining Cu with Zr in fabricating spin valves, one skilled in the art reviewing Takuji would not turn to Egelhoff to achieve the results of Applicant's invention. Because Takuji and Egelhoff use distinctly different materials in fabricating spin valve heads, and the properties of the materials used in fabricating spin valves vary widely, combining references using uncommon spin valve materials is improper. Accordingly, the Office Action makes an erroneous assertion that motivation to combine the reference is "the unexpected gains in spin valve performance experienced by the spin valve heads of Egelhoff."

Takuji does not suggest or teach incorporating the teachings of Egelhoff, nor does Egelhoff suggest a combination with Takuji. As applied here, the only alleged support for combining the teachings of Takuji in view of Egelhoff is the flawed application of Egelhoff to Takuji, as discussed above. In view of this error, this alleged support cannot be considered "evidence" in support of a suggestion, teaching, or motivation to combine the asserted references. Instead, the Office Action combines the prior art references without evidence of such a suggestion, teaching, or motivation. Therefore, the Office Action has taken Applicant's application and used it to piece together the references, thereby using impermissible hindsight. *See* M.P.E.P. § 2145. In light of not presenting a proper motivation as a basis for making and asserting the combination of references,

Applicant respectfully submits that a prima facie case of obviousness has not been presented and the rejection under 35 U.S.C. § 103 should be withdrawn.

For the above-stated reasons and for the reason that follows, claim 39 is patentable over the cited prior art. Claim 39 requires "oxidizing the at least one copper layer in the NiMn top spin valve to provide a negative coupling field without affecting GMR effect or resistance." Neither Takuji or Egelhoff teaches, discloses or suggests "oxidizing the at least one copper layer in the NiMn top spin valve that provides a negative coupling field without affecting GMR effect or resistance." Therefore, claim 39 is in condition for immediate allowance.

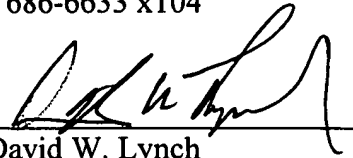
Dependent claims 2-14 are also patentable over the reference because they incorporate all of the limitations of the corresponding independent claim. Further, dependent claims 2-14 recite additional novel elements and limitations. Applicant reserves the right to argue independently the patentability of these additional novel aspects. Therefore, Applicant respectfully submits that dependent claims 2-14 are patentable over the cited patent.

On the basis of the above amendments and remarks, it is respectfully submitted that the claims are in immediate condition for allowance. Accordingly, reconsideration of this application and its allowance are requested.

If a telephone conference would be helpful in resolving any issues concerning this communication, please contact Attorney for Applicants, David W. Lynch, at 651-686-6633 Ext. 116.

Respectfully submitted,  
Crawford Maunu PLLC  
1270 Northland Drive, Suite 390  
St. Paul, MN 55120  
(651) 686-6633 x104

Date: May 18, 2004

By:   
David W. Lynch  
Reg. No. 36,204